

## **Electronic Performance Support Systems (EPSS): An Effective System for Improving the Performance of Libraries**

**Madhuresh Singhal & T S Prasanna**  
**National Centre for Science Information**  
**Indian Institute of Science**  
**Bangalore 560012**

**Email: [madhuresh@ncsi.iisc.ernet.in](mailto:madhuresh@ncsi.iisc.ernet.in) & [prasanna@ncsi.iisc.ernet.in](mailto:prasanna@ncsi.iisc.ernet.in)**

---

### **Abstract**

EPSS is a well-structured system for improving the performance of organisation/institution by means of improving the performance of manager and staff. In this paper we have discussed how effectively EPSS can be implemented in a library by making use of its characteristics and benefits. Also the role of technology in improving the performance of libraries keeping in mind the advantages and limitations of EPSS have been discussed. The article tries to attempt to cover from the basics of EPSS to the implementation of EPSS in Libraries and Information Centres.

---

### **1. Introduction**

Recent years have seen an accelerating interest in performance support as an alternative to traditional training in technical environments. Not surprisingly, the range of electronic performance support technologies is broadening in line with the increasing use of computers at home and work. Electronic Performance Support Systems are making inroads into office and manufacturing environments - hot on the heels of the computer revolution.

The performance support approach is rapidly spreading throughout the professional training community as an alternative approach to training, and is offering a new set of interface design principles for professionals in the human computer interface design community.

### **2. What is EPSS?**

According to Gloria Gery, an Electronic Performance Support Systems is “An integrated electronic environment that is available to and easily accessible by each employee and is structured to provide immediate, individualized on-line access to the full range of information, software, guidance, advice and assistance, data, images, tools, and assessment and monitoring systems to permit job performance with minimal support and intervention by others.”

An EPSS is the electronic infrastructure that captures, stores and distributes individual and corporate knowledge assets throughout an organisation to enable individuals to achieve required levels of performance in the fastest possible time and with a minimum of support from other people.

EPSS (Electronic Performance Support Systems) are systems that provide employees with the information, advice and learning experiences they need to get up to speed as quickly as possible and with the minimum of support from other people. An EPSS also provides the electronic infrastructure that captures, stores and distributes knowledge throughout an organization to enable it to learn faster than its competitors.

Also we can call EPSS as an electronic system that directly supports a staff's performance when, how, and where the support is needed.

By combining all the definitions we can say an EPSS:

- Encompasses all the software needed to support the work of individuals.
- Integrates knowledge assets into the interface of the software tools, rather than separating them as add-on components.
- Looks at the complete cycle including the capture process as well as the distribution process.
- Includes all the management of non-electronic as well as electronic assets.
- Has the ability to work with the existing Knowledge Based Systems (KBS).

Electronic Performance Support Systems are used for:

- Task structuring support: help with how to do a task (procedures and processes),
- Access to knowledge bases (help user to find information needed)
- Alternate forms of knowledge representation (multiple representations of knowledge, e.g., video, audio, text, image, data)

### 3. Characteristics of EPSS:

An electronic performance support system (EPSS) displays some or all of the following characteristics.

**Computer-based:** EPSS are computer-based, which is what the “electronic” in their name indicates.

**Access during task:** EPSS provide access to the discrete, specific information needed to perform a task at the time the task is to be performed. This is a two-part characteristic:

1) Access to the specific information needed to perform a task, and 2) Access to the information at the time the task is to be performed.

**Used on the job:** An EPSS provides information to people at their workstation on the job, or in simulations or other practice of the job.

**Controlled by the staff:** The staff decides when and what information is needed. There is no need for a teacher, as the staff is guided by the needs of the task.

**Reduce the need for prior training:** The easy availability of the information needed to perform a task reduces the need for much (but probably not all) prior training in order to accomplish the task.

**Easily updated:** The very nature of an EPSS, that it provides the information needed to perform a task, requires that it be easily updatable, in order to keep the information that it

provides current. The computerized nature of an EPSS makes updating faster and easier in some ways than in other media, such as print, video, or audio.

**Fast access to information:** The user must be able to access the needed information quickly when it is needed on the job and avoidance of irrelevant information.

**Remote delivery of training:** Removes/reduces the costs associated with attending courses including instructor costs, accommodation and fooding costs.

**Allow for different levels of knowledge in users:** In order to speed up information access and understanding, an EPSS can provide minimal information for those who do not want details; yet, through the hypertext links in the databases and through optional tutorials provide detail for those who do want more.

**Allow for different learning styles:** Through multimedia, an EPSS can accommodate users with varied learning styles, thus providing more optimal learning. The same information can be presented in visual, textual, and audio formats, with the user selecting the format.

**Integrate information, advice, and learning experiences:** An EPSS can integrate information, advice, and learning experiences for the user.

An EPSS is not an absolute system that contains all these characteristics. Rather, different systems will fall on a continuum of these characteristics. An EPSS displaying all these characteristics would be the ideal. Since performance support systems are still young, it is more likely that many will display only the key characteristics.

#### **4. Why EPSS is needed in Indian Libraries?**

There are a number of good reasons why a performance support approach is becoming increasingly attractive. To name a few:

- The Indian work force is suffering from information overload. Indeed, the total volume of business information, said to be doubling every two to three years, is growing exponentially.
- The traditional training approach is not working for many libraries. A growing body of educational research concludes that learning is far more effective when it takes place in context of work. And many organizations report that only 10 to 15 percent of what employees know was learned in formal training.
- A variety of social and economic reasons have forced libraries to analyze their current and future performance requirements so that they may remain competitive.
- Without performance support, corporate knowledge is situated in the heads of its staff, and should they leave or be transferred, the knowledge leaves with them. With an EPSS, the know-how resides in the computer and is available to any of its users.
- The cost advantages of EPSSs include "increased productivity, reduced lost opportunity costs, reduced support costs; and reduced training event costs".
- Strategically EPSS could lead to "improved quality, increased retention of corporate knowledge, and improved responsiveness to changes".

## 5. Implementation of EPSS in Libraries

As told earlier, EPSS can especially be used for improving the performance of libraries. This can be done by improving the performance of the staff. For doing this some serious steps has to be taken. First step could be to know the strength and weakness of each staff of the libraries in terms of their qualification and expertise. Keeping this in mind, work can be assigned to them to get the maximum output, which in turn can improve the performance of the library.

A manual should be prepared about the work being done by library staff and what are all the approaches they are adapting at present. Generally in classification, cataloguing, and shelf arrangement, they are interpreting the standards in their own way and also they may be using their own developed rules or they may be having some other local practices. These all should be recorded so that if any new staff joins, they may come to know about that easily and can continue with that. Otherwise it will take time to understand and cope up with the previous things being done. Also staff may not be able to use the technology to its full extent. For example, MS-Word is a powerful package being used by almost everybody in his or her routine operation. But very few know about all its features and are using 20-30% of its capability. EPSS can help in this case as it is having strong potentials to help people acquiring job related skills. Let us see some guidelines and steps for implementing EPSS.

### 5.1 Potential Roadblocks

There are some potential roadblocks in implementing this EPSS in Libraries. They are:

- ✓ Coordination among the staff of different sections inside the libraries.
- ✓ Lack of integrated system approach.
- ✓ Lack of Extensive cross-disciplinary training and re-training.
- ✓ An additional perceived roadblock is that much of the technical infrastructure available to implement EPSS is complex and still emerging.

### 5.2 Identifying Opportunities

How do you identify opportunities in your organization for electronic performance support? Here are three things look for, each of which presents a major opportunity for EPSS:

**Performance Problem:** Is there a performance problem in library? Is there a gap between the best and worst job performers? Are training courses and documentation not improving performance enough? Are users suffering from information overload? Are employee turnover or fast changing job requirements resulting in inadequate performance levels? A "yes" to any of these would indicate an opportunity for EPSS to help improve performance.

**Computer - based training project:** Are you building computer - based training (CBT) or multimedia - based training? If yes, have you considered the benefits of integrating the CBT into a performance support framework? Doing so gives a double benefit: You can use the training modules you build both as a learning tool and as a reference tool.

**On - line documentation / CD-ROM:** Are you putting documentation on-line (e.g., on the Web) or planning to distribute it on CD-ROM? If you are, consider restructuring the documentation in the form of a performance support system. Reading documentation on-line is 30 percent slower than on paper, so if you don't tailor it to electronic media you risk making the performance problem worse, not better. Using hypertext, intelligent technologies, and visual programming language, you can turn your documentation into a much more powerful performance support system.

### **5.3 Content Features of EPSS**

Some of the content features of EPSS include:

- User procedures -- step-by-step instructions on performing system transactions
- Demonstrations on how to conduct selected transactions
- Process maps, flow charts and process overviews
- Glossaries and key word search functions
- Checklists, frequently asked questions, exercises and job refreshers in text or graphic format
- Computer-based training (CBT)

### **5.4 Components of a Electronic Performance Support System**

Most EPSS consists of four components: (a) an advisory component, (b) an information component, (c) a training component, and (d) the user interface component.

There are no published detailed systematic design guidelines for developing an EPSS. While help for designing the overall structure of an EPSS is limited, there is more specific help for the individual components of the EPSS. This is because EPSS utilize many technologies that are usually used to build standalone, single purpose tools.

#### ***Advisory Component***

The advisory component usually consists of one or more job aids. There is a common approach to designing job aids. The process consists of: (a) identifying the task for which a job aid will be developed, (b) determining what type of job aid best fits the desired performance, (c) designing and build the job aid, and (d) evaluating the job aid.

#### ***Information Component***

The information component can use any combination of databases, hypertext, and on-line help systems.

**Databases:** Database systems are computer systems designed for the relatively permanent storage and retrieval of data. Database systems usually provide methods for adding, deleting, and changing the data in the database. Database systems usually provide methods for querying the database to gather subsets of the data.

**Hypertext:** Hypertext is a non-linear way to go through information. With hypertext you go through the information topic by topic, only viewing the information that is relevant to your purpose.

**On-line help systems:** On-line help systems should be part of every software application. Five types of questions that should be answered by an on-line help system: (a) goal-oriented, (b) descriptive, (c) procedural, (d) interpretive, and (e) navigational.

### ***Training Component***

There are important differences between the way instructions should be built for traditional CBT lessons and the way instruction should be built for use in EPSS.

***Traditional CBT lessons:*** Instructional designers frequently use task analysis to determine the sections required to meet an instructional goal of the CBT lesson and the desired sequencing of the sections in the CBT lesson.

***Instruction in EPSS:*** Enforcing the viewing of prerequisite knowledge should not be present in EPSS. Links to the prerequisites should be provided, but viewing them should not be mandatory. Lesson segments should be as small as possible. Lesson segments should be self-contained.

### ***User Interface Component***

The only EPSS specific guideline for user interface design is to provide a consistent user interface across all the other components of the EPSS. This concept is critical to the success of EPSS.

## **6 Role of technology in Improving Performance**

Several technology trends are making the shift toward performance support easier to implement. Here are some of the keys enabling technologies:

***Hypertext:*** This technology provides for the electronic linking of information that provides a flexible approach to disseminating large volumes of cross-reference material - often called an "information base" in EPSS terminology. It is particularly useful when combined with such text retrieval technologies as "key-word" searches (i.e., the author links important words that the staff may want to use to retrieve some small chunk of knowledge), or full-text searches (i.e., the EPSS searches every word in its information base to match a word typed by the staff).

***The Internet:*** The Internet as a whole and the World Wide Web in particular are opening up new EPSS opportunities, especially for distribution organizations made up of field service technicians and company sales forces.

***CD-ROM:*** Another way of distributing an EPSS, CD-ROM can be used either as an alternative to, or in conjunction with, the World Wide Web. CD-ROM becomes a desirable option when staffs don't have access to an Internet connection or when the information base contains a large amount of graphics, sound, or video.

***Portable Devices:*** A steady drop in prices is making portable devices increasingly affordable. These include laptop and notepad computers as well as hand-held devices like the Apple Newton.

### ***Intelligent Technologies***

An essential attribute of an EPSS is to augment the human problem-solving process by automating some of the more routine reasoning processes. Here are some technologies being used in performance support applications:

***Visual programming languages:*** Visual programming languages have made considerable strides over the past few years. These languages let you build an EPSS

using an approach called "rapid prototyping" in which you iteratively develop the EPSS to meet staffs needs.

**Object-oriented languages:** Object-oriented program languages let you build software that behaves more intelligently.

**Rule-based knowledge systems:** This technology lets you present knowledge as a series of "if then" rules, which the computer will use to help recommend decisions or make selections. This technology, also known as an "expert system", has been heavily refined over the past two decades, and there are established methodologies or building these rule bases.

**Case-based reasoning:** This approach involves creating a database of case studies or examples of problems and their associated solutions. It also provides tools to search the database to match a current problem with a previous example. In this way, past history and the accumulated expertise of others in an organization can be preserved and retrieved to help solve new problems as they arise.

**Neural networks:** This technology helps you analyze patterns in data, and use these patterns to predict future behavior.

**Model-based systems:** These tools let you build a model of a physical system, then use the model to simulate various scenarios and diagnose problems.

**Emerging Methodology:** A recent trend is the establishment of cross-functional groups within companies to develop performance support systems. Accompanying this move is a merging of professional disciplines. Among the new titles appearing on business cards are "performance support specialist", "performance support developer" and "performance support manager" - terms that are replacing "instructional designer" or "training manager."

**Hybrid Methodology:** Because the scope of performance support is broad, The methodology for its development is broader than for many existing disciplines. Performance support engineering is in fact a hybrid approach that includes elements of information and systems engineering, computer / human interaction and interface design, business process reengineering, instructional systems development, computer based training, human performance technology, organizational design, knowledge engineering, and technical writing.

## **7 Advantages and Limitations of Electronic Performance Support Systems**

### **Advantages**

- EPSS use a wide range of technologies in their components.
- EPSS incorporate job aids and therefore have the same advantages as job aids.
- EPSS also incorporate CBT lessons. The CBT lessons provide the mechanism for the employees to gain an understanding of the content of the job aids.
- EPSS provides the user a seamless interface to move between the CBT lessons and the job aids.
- EPSS reduce the cognitive overhead of manipulating more than one system.

### **Limitations**

As happens with most new technologies, some people will promote EPSS as the answer to all problems. Like most technologies, PSS has its limitations.

1. Learning should take place on the job in small increments.
2. Skills will be lost.
3. It is hard to justify the cost to develop traditional CBT. How are people going to justify the cost of developing the much more complicated EPSS.

## 8 Conclusion

The electronic performance support system (EPSS) point of view has been revolutionary. Its significance was how it re-framed our thinking from the training paradigm of "fill them up with knowledge and skills and then put them to work".

While EPSSs are being used in business, there are few studies that test the effectiveness of EPSSs. What information that is available on EPSSs indicates that EPSSs have the potential to significantly improve libraries performance. This potential performance improvement is the reason that EPSS should be evaluated and the actual improvement determined. Performance support systems could be a significant benefit to the next generation of training and educational technology. The time is ripe for a paradigm shift. EPSSs should be examined as a possible direction for that shift.

Finally it is important to note that, although EPSS can be highly effective as a means of providing users timely and relevant information, there is a great challenge in using these tools effectively in libraries.

## 9. References

1. Stanley E. Malcolm. "Where EPSS will go from here." *EPSS Tomorrow*. March, 1998, pp64-69. <http://www.performance-vision.com/articles/art-epss2mrw.htm>
2. Stephen W. Harmon. Performance Support Systems for Education and Training: Could This be the Next Generation?  
<http://www.gsu.edu/~wwwitr/docs/nextgen/index.html>
3. [http://www.pcd-innovations.com/key\\_concepts.htm](http://www.pcd-innovations.com/key_concepts.htm)
4. Raybould, Barry. "Performance Support Engineering: An Emerging Development Methodology for Enabling Organisational Learning." *Performance Improvement Quarterly*. 1995, 8 (1): pp.72.
5. <http://www.epssinfosite.com>
6. <http://www.epssinfosite.com/winwriters.ppt>
7. Deborah Alpert Sleight. Types of Electronic Performance Support Systems: Their Characteristics and Range of Designs. 1993: Educational Psychology. Michigan State University. [http://www.msu.edu/~sleightd/epss\\_copy.html](http://www.msu.edu/~sleightd/epss_copy.html)  
<http://www.pcd-innovations.com/infosite/whatepss.htm>